

# Results on a New Extended Analytic Model to Understand the Radiation Performance of Mod-P Sierpinski Fractal Multiband Antennas

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Analytic models for antennas are specially attractive since they permit to understand the radiation principles of antennas. This understanding becomes more difficult when just using common antenna numerical analysis techniques. Multilevel structures are a set of geometries with a more flexible approach than early Sierpinski fractal designs, which provide a technological solution to built multiband antennas. However, multilevel-shaped antennas (Multilevel Antennas, Invention Patent WO0122528) feature such complex forms which makes difficult to develop analytic models to understand, calculate and predict their radiation performances. In (C.Puente, J.Soler, Analysis of Fractal-Shaped Antennas using the Multiperiodic Traveling Wave Vee Model, IEEE Antennas and Propagation Society International Symposium, Boston, July 2001) an analytic model was introduced for the calculation of the radiation performance of the classical Sierpinski-like monopole antenna. As it was previously reported by the author, the well-known Sierpinski-like antenna is a special case of a wider class of antennas and can be referred as the mod-2 Sierpinski gasket.

The original analytic model can be extended and improved; that is, the novel extension not only adds to the model the capability to calculate the whole radiation pattern, but also accounts for the self-scalability of the active current region in the antenna structure as a function of the frequency. The inclusion of this self-scalability in the formulation allows to improve the results from the original formulation in the calculation of the antenna patterns specially at the higher resonances. The novel extension of the analytic model is described in detail and the analytical results are compared with measured patterns for different mod-p Sierpinski-like multiband antennas.

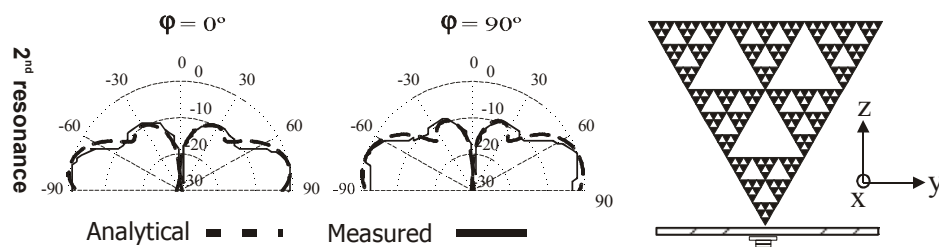


Fig 1 Comparison between measured and analytic main vertical cuts of the radiation pattern for the mod-3 Sierpinski-like monopole antenna at the second odd resonance. Analytical data is shown in dashed line.